CLAIMS

What is claimed is:

1. A method of treating emphysema in a mammal comprising administering to a mammal in need of such treatment a therapeutically effective amount of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof.

2. The method of Claim 1, wherein the therapeutically effective amount of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, is between about 0.1 μg and about 10.0 mg.

3. The method of Claim 2, wherein the therapeutically effective amount of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, is between about 1.0 μg and about 1.0 mg.

4. The method of Claim 3, wherein the therapeutically effective amount of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, is between about 5.0 μg and about 15.0 μg.

5. The method of Claim 3, wherein the therapeutically effective amount of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, is between about 100.0 μg and about 300.0 μg.

6. The method of Claim 1, wherein the therapeutically effective amount of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, repairs alveoli in the mammal.

7. The method of Claim 1, wherein the mammal is human.

8. The method of Claim 7, wherein the human was or is a cigarette smoker.

9. The method of Claim 1, wherein the emphysema is panlobar emphysema, centrilobular emphysema or distal lobular emphysema.

10. The method of Claim 1, wherein the therapeutically effective amount of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, is administered with an electrohydrodynamic aerosol device.

11. A pharmaceutical composition suitable for treating a mammal suffering from emphysema comprising an amount of 13-*cis*-retinoic acid or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, and a pharmaceutically acceptable carrier, said amount being sufficient to alleviate one symptom of emphysema.

12. The pharmaceutical composition of Claim 11, wherein the pharmaceutically acceptable carrier is suitable for electrohydrodynamic aerosol device, a aerosol device or a nebulizer device.

13. The pharmaceutical composition of Claim 11, wherein the amount of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, is between about 0.1 μg and about 10.0 mg.

14. The pharmaceutical composition of Claim 13, wherein the amount of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, is between about 1.0 μg and about 1.0 mg.

15. The pharmaceutical composition of Claim 14, wherein the amount of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, is between about 100.0 μg and about 300.0 μg.

16. The pharmaceutical composition of Claim 12, wherein the pharmaceutically acceptable carrier is a liquid.

17. The pharmaceutical composition of Claim 16, wherein the pharmaceutically acceptable carrier is chosen from the group consisting of water, alcohol, polyethylene glycol and perfluorocarbon.

18. The pharmaceutical composition of Claim 16, wherein the amount of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, is between about 1.0 μg and about 100.0 μg.

19. The pharmaceutical composition of Claim 18, wherein the amount of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, is between about 3.0 μg and about 30.0 μg.

20. The pharmaceutical composition of Claim 19, wherein the amount of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, is between about 5.0 μg and about 15.0 μg.

21. The method of Claim 9, wherein the mammal is human.

22. The method of Claim 21, wherein the human was or is a cigarette smoker.

23. The method of Claim 11, wherein the emphysema is panlobar emphysema, centrilobular emphysema or distal lobular emphysema.

24. A method for treating emphysema and related disorders comprising delivering a formulation of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, into the lungs of a mammal.

25. The method of Claim 24, wherein the emphysema is panlobar emphysema, centrilobular emphysema or distal lobular emphysema

26. The method of Claim 24, wherein the mammal is human.

27. The method of Claim 26, wherein the human was or is a cigarette smoker.

28. The method of Claim 24, wherein the formulation is delivered into the lungs of the mammal with a nebulizer device.

29. The method of Claim 24, wherein the formulation is delivered into the lungs of the mammal with a aerosol device.

30. The method of Claim 24, wherein the formulation is delivered into the lungs of the mammal with a electrohydrodynamic aerosol device.

31. A method for treating emphysema comprising combining the use of 13-*cis*-retinoic acid with one or more additional therapies.

32. The method of Claim 31, wherein the additional therapies are chosen from the group consisting of smoking cessation, bronchodilators, antibiotics and oxygen therapy.

33. A method for preventing emphysema in a human at risk of emphysema comprising administering to the human a amount of 13-*cis*-retinoic acid, or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof, said amount being sufficient to prevent emphysema.

34. The method of Claim 33, wherein the human was or is a cigarette smoker.

35. A pharmaceutical composition suitable for preventing emphysema in a human at risk of emphysema comprising an amount of 13-*cis*-retinoic acid or a pharmaceutically acceptable salt, hydrate, solvate, or pro-drug thereof and a pharmaceutically acceptable carrier, said amount being sufficient to prevent emphysema.

Applicant's Docket